IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of: Nguyen et al.
Serial No.: 10/824,836
Filed: 04/15/2004
For: LOW LOSS CHALCOGENIDE GLASS AND PROCESS FOR MAKING SAME USING ARSENIC MONOCHALCOGENIDE
Examiner: Lazorcik, Jason L
Art Group Unit: 1731

DECLARATION UNDER 37 C.F.R. § 1.132 OF VINH NGUYEN

I, Vinh Nguyen, hereby declare that:

1. I am a co-inventor of the invention claimed in the above-identified patent application. My position at the US Naval Research Laboratory is Research Scientist. I consider myself qualified to testify the field of high purity materials.

2. Attached is a graph comparing the attenuation of four arsenic sulfide glasses made by distilling arsenic monosulfide and sulfur, followed by drawing into a fiber. The arsenic/sulfur ratio in both glasses was approximately the same (39/61).

3. Line (a) shows the results for glass made by distilling at 750°C in a closed vacuum system, using the method taught in Churbanov et al. *J. Optoelectronics and Adv. Mat.*, 3(2), 341-349 (2001). The graph shows several major absorbances. Notably, there is a very large attenuation of over 30 dB/m at about 4 microns due to S-H bonds. These bonds are believed to be formed because arsenic monosulfide decomposes at high temperatures, such as above about 550°C. After decomposition, the sulfur bonds to hydrogen found in the vessel walls. Such decomposition also occurs in other arsenic monochalcogenides.

4. Lines (b)-(d) shows the results for glasses made by distilling at 450°C in an open vacuum system according to the process disclosed in the present specification. The absorbance at 4 microns is greatly reduced, by more than an order of magnitude in all three experiments. At this lower distillation temperature, arsenic monosulfide does not decompose and very little S-H is formed. This results in a glass that may be more useful for transmission in the 4 micron range.

5. Line (a) also shows large absorbances for OH and H_2O. Lines (b)-(d) show that the claimed process reduces these absorbances by over 2-3 orders of magnitude.

6. The open vacuum system enables distillation at the lower temperature. If the system were closed at the low temperature, glass vapors would build up in the vessel to the point where

it would be necessary to raise the temperature for distillation to continue, which would cause the described decomposition of arsenic monochalcogenide. In an open system, glass vapor does not build up, so distillation may continue at the low temperature.

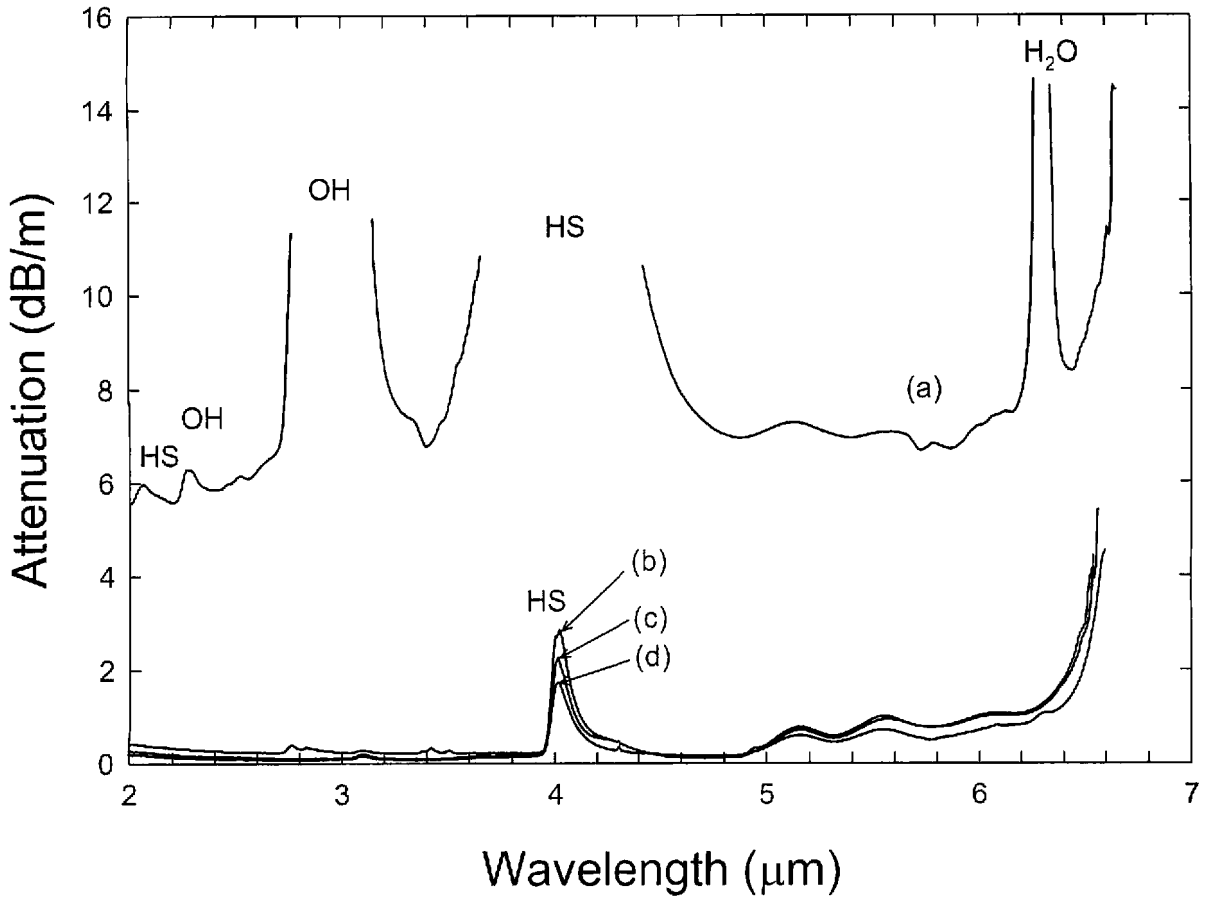
7. The improvement in the properties of the glasses is not the result of mere optimization and is unexpected. The improvement is attributed to different chemical processes occurring in the claimed method and the method of Churbanov, not to the same processes occurring to a different degree. The improvement does not scale linearly with the distillation temperature.

8. The presently claimed method can result in less than 1 ppm of contamination in the final product. Despite any purification taught by Churbanov et al., the extra steps of handling the purified materials would result in higher levels of contamination that in the presently claimed method.

9. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

4/9/08
Date

Vinh Nguyen
Vinh Nguyen



	Fiber	Minimum Loss (dB/m)	OH Absorption (dB/m) at 2.92 μm	HS Absorption (dB/m) at 4.03 μm	H_2O Absorption (dB/m) at 6.32 μm
Churbanov	(a)	5.7 at 2.27 μm	> 20	> 30	> 10
Claimed method	(b)	0.09 at 3.44 μm	0.005	2.04	0.003
Claimed method	(c)	0.07 at 2.72 μm	0.005	2.60	0.003
Claimed method	(d)	0.10 at 4.80 μm	0.060	1.50	0.060